Name: Date: Period:

**Carbon and Oxygen Cycles Activity**

Introduction: Oxygen is the second most abundant gas in the Earth’s atmosphere and is used directly from the atmosphere by most plants and animals. It is essential for *respiration*, the cellular process during which living things chemically combine oxygen with food to release energy. Oxygen is also necessary for the combustion of fuels such as oil, coal and wood, as well as many other chemical and biological reactions on Earth.

In comparison to oxygen, the carbon dioxide represents a very small fraction of the atmosphere. It is an important raw material used by plants in the process of *photosynthesis*, to produce food. Carbon dioxide is removed from the atmosphere by plants during this food-making process and returned to the atmosphere by the respiration of other plants and animals, as well as through the *decompositions* of dead plant and animal material.

Scientists believe that in a healthy atmosphere the amount of carbon dioxide used by plants equals the amount returned to the atmosphere by respiration, decay and other natural processes. However, human activities, such as the burning of fossil fuels and the destruction of large tracts of forests, is adding excessive amounts of carbon dioxide to the atmosphere and possibly increasing the concentration to a dangerous level. Because of carbon dioxide’s ability to absorb heat energy from the Earth’s surface, increased levels of carbon dioxide being trapped could raise the heating potential of the atmosphere, causing the Earth’s average global temperature to increase and causing potentially serious consequences in the Earth’s ocean/atmosphere system.

Analysis & Comprehension – Part 1:

1. What does the diagram of the oxygen-carbon dioxide cycle illustrate?
2. Why could you say that the cycle is in balance?
3. Name 3 sources of carbon dioxide.
4. What are some sources of oxygen?
5. What role does carbon dioxide play in plant life processes?
6. What process in animal cells requires oxygen?
7. If all the vegetation in the pond died, what effect would it have on the animals? Why?
8. If the reverse happened, how would the aquatic plants be affected? Why?
9. Why is this natural process called a *cycle*?
10. Why is the burning of fossil fuels a concern for scientists?
11. What would be a direct effect of increases in the amount of gases?
12. What problem could this create for life on Earth?

Part 2:

1. What is the source of energy behind the carbon cycle?
2. What is the food-producing process in plants?
3. Write the chemical equation for this process.
4. What substance is the byproduct of this process?
5. Why could you say: plants are a sink for carbon?
6. What happens to the carbon stored in plants when they die?
7. Which greenhouse gas is given off during decomposition?
8. How have humans added excess amounts of this gas to the atmosphere?
9. What other human activity is over-loading the carbon cycle?
10. Where does the C(arbon) in fossil fuels come from?
11. How have humans caused an imbalance in the carbon cycle?

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Analysis & Comprehension – Part 1:

1. What does the diagram of the oxygen-carbon dioxide cycle illustrate?

**There is an intricate balance between the 2 components, including all the organisms that use and need those 2 components. The organisms work together to ensure they collect the needed requirements, without one organism or component, the entire cycle would be out of order.**

1. Why could you say that the cycle is in balance?

**There’s a constant cycle between the release and use of both components by the creatures needing them.**

1. Name 3 sources of carbon dioxide.

* **Given off by animals**
* **Given off by decaying organic matter**
* **From respiration available to plants**

1. What are some sources of oxygen?

* **Given off by plants**
* **From photosynthesis**
* **Used by animals**

1. What role does carbon dioxide play in plant life processes?

**Carbon dioxide is used in photosynthesis to produce food. It’s removed from the atmosphere by plants and returned to the atmosphere.**

1. What process in animal cells requires oxygen? **respiration**
2. If all the vegetation in the pond died, what effect would it have on the animals? Why?

**The animals would lose the opportunity to respirate due to an increased source of carbon dioxide, ultimately depleting the oxygen needed.**

1. If the reverse happened, how would the aquatic plants be affected? Why?

**The aquatic plants would not be able to photosynthesize as necessary due to the lack of free carbon dioxide from the respiration process of animals.**

1. Why is this natural process called a *cycle*?

**The oxygen-carbon dioxide process is considered a cycle because it’s a series of events that recur regularly and usually lead back to the starting point.**

1. Why is the burning of fossil fuels a concern for scientists?

**The burning of fossil fuels is adding excessive amounts of carbon dioxide to the atmosphere, thus increasing the average global temperature and causing severe consequences to the Earth’s ocean/atmosphere system.**

1. What would be a direct effect of increases in the amount of gases?

**The direct effect of increases in the amount of gases would be adding excessive amounts of carbon dioxide to the atmosphere, thus raising the heating potential of the atmosphere.**

1. What problem could this create for life on Earth?

**There would be a huge disruption between the balance of life on Earth.**

Part 2:

1. What is the source of energy behind the carbon cycle? **sunlight**
2. What is the food-producing process in plants? **photosynthesis**
3. Write the chemical equation for this process.

**CO2 + H2O + sunlight = C6H12O2 + O2**

1. What substance is the byproduct of this process?

**Oxygen (O2)**

1. Why could you say: plants are a sink for carbon?

**Carbon is stored in plant tissues until death. They also keep the carbon as part of the carbohydrates they need for growth and repair within the process of photosynthesis.**

1. What happens to the carbon stored in plants when they die?

**It decomposes.**

1. Which greenhouse gas is given off during decomposition? **CH4 (methane)**
2. How have humans added excess amounts of this gas to the atmosphere?

**Burning of fossil fuels.**

1. What other human activity is over-loading the carbon cycle?

**Waste disposal and agriculture.**

1. Where does the C(arbon) in fossil fuels come from?

**Coal and oil; plants; decomposition**

1. How have humans caused an imbalance in the carbon cycle?

**Gases such as carbon dioxide and CH4 (methane) are building up in the atmosphere.**